#  Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Date: \_\_\_\_\_\_\_\_\_\_\_

# Chemistry: *Molarity of Solutions*

*Directions: Solve each of the following problems. Show your work and include units for full credit.*

1. What mass of the following chemicals is needed to make the solutions indicated?

 a. 1.0 liter of a 1.0 M mercury (II) chloride (HgCl2) solution

 b. 2.0 liters of a 1.5 M sodium nitrate (NaNO3) solution

 c. 5.0 liters of a 0.1 M Ca(OH)2 solution

 d. 100 mL of a 0.5 M (NH4)3PO4 solution

2. Calculate the molarity of the following solutions.

 a. 12 g of lithium hydroxide (LiOH) in 1.0 L of solution

 b. 198 g of barium bromide (BaBr2) in 2.0 L of solution

 c. 54 g of calcium sulfide (CaS) in 3.0 L of solution

3. Calculate the volume of each solution, in liters.

 a. a 1.0 M solution containing 85 g of silver nitrate (AgNO3)

 b. a 0.5 M solution containing 250 g of manganese (II) chloride (MnCl2)

 c. a 0.4 M solution containing 290 g of aluminum nitrate (Al(NO3)3)

Answers: 1a. 272 g HgCl2 2a. 0.50 M LiOH (aq) 3a. 0.50 L AgNO3 (aq)

 1b. 255 g NaNO3 2b. 0.33 M BaBr2 (aq) 3b. 4.0 L MnCl2 (aq)

 1c. 37 g Ca(OH)2 2c. 0.25 M CaS (aq) 3c. 3.4 L Al(NO3)3 (aq)

 1d. 7.5 g (NH4)3PO4

**M1V1 = M2V2**

Making Dilutions Worksheet

Remember that you can change the concentration of a solution by adding more solvent. While you cannot increase the concentration of a solution in this manner, you can create a more dilute solution by increasing the amount of solvent. You can determine the amount of a solution needed to dilute by using the following:

M1 x V1 = M2 x V2

Where M = molarity and V = volume. M1 and V1 are the initial solution’s molarity and volume, while M2 and V2 are the final solution’s molarity and volume. If needed, you can find the molarity of a solution by the usual formula: M = moles of solute/ liters of solution

Use the formula and information above to solve the following problems. Show your work and watch labels. The first three problems are questions regarding molarity and the others involve the dilutions formula above.

1. You need to make 300 mL of a 0.40 M solution of sodium chloride. The only available solution is 1.0 M. Determine how to make the needed dilution.

Given: Setup and solve for V1 and you answer will be in mL

M1= 1.0 M NaCl

V1 = ?

M2 = 0.40 M NaCl

V2 = 300 mL

1. You have to make 500 mL of a 0.50 M BaCl2 . You have 2.0 M barium chloride solution available. Determine how to make the needed dilution
2. You need to make 10.0 L of 1.2 M KNO3 . What molarity would the potassium nitrate solution need to be if you were to use only 2.5 L of it?
3. Using a 4.0 M solution of MgSO4 , determine how to make 300 mL of a 1.7 M dilution.
4. If you dilute 174 mL of a 1.6 M solution of LiCl to 1.0 L, determine the new concentration of the solution.